charging the capacitive load in a plurality of steps after the first charging cycle.

80. The method of Claim 79 further comprising discharging the capacitive load after the first charging cycle in a plurality of steps.

B3

REMARKS

Claims 1-80 are presented for disposition.

Claims 1-11 are identical to Claims 1-11 in the issued patent on which this reissue application is based. During a telephone conference with the Examiner on December 13, 1999, the Examiner stated that these claims are allowable. This was confirmed in an Interview Summary, mailed December 14, 1999.

Claims 12, 13, 17, 20-23, 26-33, 36, 38, 40, 41, 43, 45-47, 50-55, 58, 59, 62, 63, 66-68 and 70-72 were previously presented and have been amended by this Preliminary Amendment.

Claims 73-80 are newly presented by this Preliminary Amendment.

Explanation of Support

In accordance with 37 C.F.R. §1.121(b)(2)(iiii), applicants provide the following explanation of the support in the patent disclosure for the amended and new claims: Each of the amended and new claims are supported in the patent disclosure at, *inter alia*, column 3, line 46 - column 4, line 54; column 5, lines 5-16; column 6, lines 51-56; and by Figs. 3, 4 and 5.

Clarifications

Claim 1 refers to a "switch means for selectively connecting each of the capacitive elements to the capacitive load . . . ." "Connecting," as used in this phrase, is intended to

embrace all types of "connecting," including direct and indirect connecting, such as an indirect connection through another electronic component. "Selectively connecting" is intended to refer to the change in status from a disconnection to a connection.

The same concepts are intended by the language "disconnect," "disconnecting," and "de-couple" that is used in many of the remaining claims. Again, these are intended to refer to both direct and indirect connections. Therefore, in order to meet the "disconnect," "disconnecting," or "de-couple" requirements, there must be no direct or indirect connection, such as an indirect connection through another component.

Significant New Evidence Establishes That it Was Not Obvious to Substitute a Capacitor for the Voltage Source

The parent to this reissue CPA application was finally rejected, based on the Examiner's belief that "(i)t would have been obvious to one having ordinary skill in the art [at] the time of the invention to replace the voltage source of applicant's admitted prior art [Fig. 2] with the charge storage element of Masuda, et al.[1] in order to provide [a] steady and cost effective power source." This rejection is respectfully traversed.[2]

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[1] Per the Examiner's request during the interview on December 13, 1999, a copy of Masuda, et al. is enclosed.

[2] Although many of the claims have been amended, Applicants are not relying upon any of these amendments to support Applicants' argument of patentability. The amendments have been made merely to clarify the subject matter that Applicants regard as their invention.

A Capacitor and Power Supply Perform Vastly Different Functions

Masuda et al. teaches what was well know - the use of a capacitor as a component of a power supply. However, Masuda et al. did not teach or even suggest the use of a capacitor as a power supply -- a fundamental feature of the invention.

To be sure, there is a vast difference between the two.

The output voltage of a typical power supply remains substantially constant under load. Indeed, this is a defining characteristic of most power supplies. The same plainly cannot be said about a capacitor. As is well known, the output voltage of a capacitor steadily declines under load.

Another obvious defining characteristic of a typical power supply is that it delivers a voltage. A capacitor, of course, cannot deliver a voltage without assistance from other components.

It was not obvious to substitute a component that provides vastly different functions.

The Skilled Artisan Would Not Have Expected a Capacitor to Work

Because of these vast functional differences, the skilled artisan would not have expected capacitors to work in lieu of the power supplies shown in Fig. 2. Such a suggestion would have been tantamount to suggesting that a battery in a flashlight be replaced by a capacitor. How would it work?

Specifically, his initial reaction would be to question how voltages would be developed across the capacitors in Fig. 3, how the voltages would be set to their needed step values, and how these voltages would be maintained when current is repeatedly drained from the capacitors during the charging cycles.

It was not obvious to modify Fig. 2 in a manner that would not have appeared to work.

Fig. 3 Functions Much Differently Than Fig. 2

Fig. 3 also functions much differently than Fig. 2 when capacitors are substituted for the power supplies in Fig. 2.

First, the voltage that is delivered to the load C_L during the first charging cycle is much different. In the prior art Fig. 2, the voltage that is delivered to the load C_L during the first charging cycle progressively increases from zero to V_N in N steps. The voltage that is delivered to the load C_L during the first charging cycle in Fig. 3, on the other hand, has only one step, regardless of the value of N -- from 0 directly to V_N.

Unlike closure of switch 1 during the first charging cycle in Fig. 2, closure of switch 1 in Fig. 3 does not cause any increase in the voltage that is delivered to the load C_L. This is because there is no charge across the capacitor 18 that is connected to switch 1 at this time. The same holds true in connection with the subsequent closures of switches 2 through N-1 during the first charging cycle. No voltage is delivered to the load C_L in Fig. 3 until closure of the final switch N.

During the discharge portion of the cycle, there is also something much different happening. In the prior art Fig. 2, the energy stored in the load C_L is typically dissipated as heat during the discharge cycle as the voltage steps downward. In Fig. 3, on the other hand, the energy stored in the load C_L is transferred back into the tank capacitors 18 during the discharge cycle. This transfer of energy causes a voltage to appear across these capacitors.

By the beginning of the second charging cycle, all of the capacitors are charged to a degree. Although they are usually still not at the levels of their corresponding supplies in Fig. 2, the voltage across each is somewhat proportional to. its position in the step ladder.

During the second charging cycle, each of the capacitors in Fig. 3 loses some of its charge. But none are usually discharged completely.

During the second discharging cycle, the voltage across each capacitor again grows. This time, however, it usually grows to a higher level than during the first discharging cycle because it begins at a higher level.

Plainly, the circuits of Fig. 2 and 3 operate in a much <u>different</u> manner.

It was not obvious to make a substitution that results in a circuit that functions much differently.

Experts Doubted That the Invention Would Stabilize At the Needed Levels

Upon seeing Fig. 3, experts in the art doubted that the voltages across the capacitors would stabilize under normal conditions to their needed values -- i.e., the values of the corresponding supplies in Fig. 2. *See* Athas Declaration at 18-21. Yet, Applicants proved and demonstrated that this is exactly what happens. *Id.* at 21.

It was not obvious to make a change that experts thought would not work.

Nothing Suggests Substituting Capacitors For All But One of the Power Supplies Shown in Fig. 2

Another significant difference relates to the fact that the circuit in Fig. 3 does not show a capacitor being substituted for <u>every</u> power supply in Fig. 2. Instead, capacitors

have only been substituted for <u>some</u> of these supplies. Indeed, the circuit in Fig. 3 would not work if capacitors had been substituted for every supply.

Nothing in the prior art teaches or suggest such a <u>partial</u> substitution.

The Circuit in Fig. 3 Provides New & Unexpected Results

Another classic indicia of non-obviousness is when the invention provides new and unexpected results. *E.g.*, M.P.E.P. § 716.02(a). That is the case here.

The energy that is delivered to the load during each charging cycle by the typical power supplies taught in Fig. 2 is mostly dissipated as heat during each discharge cycle. This wasted energy contributes significantly to the discharge of the battery that powers the typical laptop computer.

The circuit in Fig. 3, on the other hand, eliminates much of this wasted energy. Instead of dissipating it as heat during the discharge cycle, it stores it in the capacitors. This stored energy is then reused during the next charging cycle.

Plainly, this is a highly-beneficial result that is in no way taught or suggest by Masuda et al. or by Fig. 2. The presence of this new and unexpected result again demonstrates non-obviousness.

Summary

This is truly an ingenious invention. The inventors were clever enough to recognize that substituting capacitors for <u>only some</u> of the supplies in Fig. 2 would cause the circuit to <u>operate in a vastly different manner</u> and that this vastly different manner of operation would <u>overcome the problems</u> that the skilled artisans and even the experts would and did expect and, to boot, <u>be far more energy efficient</u>. Plainly, such a substitution was not <u>not</u> obvious. *Accord,* Athas Declaration (attached).

COPY OF MASUDA ET AL.

The Examiner requested an additional copy of this reference. That enclosure is enclosed.

CONCLUSION

For the foregoing reasons, it is respectfully submitted that this case is now in condition for allowance. Early notice of the same is earnestly requested.

Should the Examiner not agree, Applicants would respectfully ask the Examiner to phone Applicant's counsel at the number below to schedule an in-person interview.

Any additional fees required in connection with this communication which have not been submitted may be charged to Deposit Account No. 16-2230 in the name of Oppenheimer Wolff & Donnelly LLP. Any overpayments should be credited to this Account.

Dated: 1/12/00

Respectfully submitted,

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